CLAIMS

1. A micro-machining method of bridging a channel with at least one bridging material, the channel being provided in a second material and the method comprising the steps of:

a) partially filling said channel with an infill material at an uppermost region of said channel;

b) patterning and etching said infill material to form a hole through the infill material to the second material; and

c) depositing the at least one bridging material on to said infill material so that at least one portion of the at least one bridging material contacts the second material through the hole.

2. A method according to claim 1 comprising removing the infill material once the at least one bridging material has been provided leaving the at least one bridging material bridging said channel.

3. A method according to claim 2 comprising providing at least a portion of the at least one bridging material which is freely suspended above the second material.

4. A method according to claim 3 comprising micro-machining structures from a second material and creating at least one device suspended portion, which is substantially free from the bulk of the second material and providing at least one channel separating the device suspended portion from the bulk of the second material and providing the

freely suspended portion of the at least one bridging material extending over the channel.

5. A method according to claim 4 comprising performing a sacrificial etch to release the device suspended portion from the bulk of the second material before the infill material is provided.

6. A method according to claim 4 or 5 comprising creating the freely suspended portion of the at least one bridging material extending over the device suspended portion.

7. A method according to claim 4 comprising performing a sacrificial etch to release the device suspended portion from the bulk of the substrate after the infill material is provided.

8. A method according to claim 7 in which the at least one bridging material is not substantially etched by the sacrificial etch.

9. A method according to any one of the preceding claims comprising depositing a conductive material as the at least one bridging material.

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10. A method according to any preceding claim wherein a plurality of bridging materials are used to bridge the channel.

11. A method according to claim 10 comprising providing a supporting layer and one or more conductive layers within the bridge over the channel.

12. A method according to any preceding claim which comprises depositing the infill material using Plasma Enhanced Chemical Vapour Deposition (PECVD).

13. A method according to any preceding claim which comprises depositing one of the following materials as the infill layer: an oxide, a nitride, an oxynitride, polysilicon.

14. A method according to any preceding claim which comprises using a dual frequency PECVD system to deposit the infill material wherein the plasma is generated at a first frequency and species accelerated toward the second material at a second frequency.

15. A method according to any one of the preceding claims which causes the infill material to expand laterally across the channel

16. A method according to any one of the preceding claims comprising causing the deposited material to cap the channel sealing the channel at the top region.

17. A method according to any claim directly or indirectly dependent on claim 2 which comprises using an etching process to remove the infill material.

18. A method according to any one of claims 1 to 11 which comprises using any one of the following for the infill material: a polymer material, a polyimide, a photoresist, PIQ™, spin on glass, or other spin on dielectric.

19. A method according to claim 18 as it depends directly or indirectly upon claim 4 which comprises flowing the infill material so that it flows into the channel.

20. A method according to claim 18 or 19 which comprises using a dry etching process to remove the infill material.

21. A method according any one of claims 1 to 11 which comprises using a photoresist as the infill material and further comprises using a mask to develop the photoresist and then etching the mask to remove portions of photoresist.

22. A method according to any one of claims 1 to 11 which comprises using a polyimide as the infill material and subsequently applying a photoresist on top of the infill material to allow the infill material to be patterned and etched.